

S8-7096

Changes in zooplankton population structure during and after the north-western Mediterranean open sea spring bloom

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The northwestern Mediterranean basin is a key biogeochemical area in the Mediterranean Sea. Fertility is enhanced by deep convective mixing in winter and the consequent winter-spring bloom after re-stratification. Primary production calculated from satellite images of this area is estimated to represent more than 15% of the whole Mediterranean, with the spring bloom contributing to most of this production. In the framework of the project FAMOSO we investigated the transfer of this open sea bloom to higher trophic levels by analyzing micro-, meso-, and macrozooplankton communities during key successional stages: pre-bloom- bloom (March), decline - post-bloom (May), and stratification (September). In March a diatom bloom consisting of a typical spring-bloom assemblage developed. We encountered considerable heterogeneity of physical, chemical and biological parameters and used Principal Component Analysis to classify and cluster sampling stations (41 total). During the three stages zooplankton populations differed in biomass, size spectra, and composition. Microzooplankton always exhibited the highest biomass (average of 21.4, 6, and 7 mg dry weight m⁻³, bloom, post-bloom and stratification, respectively) with highest increase during March. Mesozooplankton biomass was high in March in comparison to the other periods (11.2, 4.9 and 5.1), suggesting water advection from a more advanced plankton successional stage. During the post-bloom stage macrozooplankton was also important, and the stratification period was characterized by lower stocks. Salps contributed significantly to the total population in March and May. These changes in composition and abundance of micro-, meso-, and macrozooplankton are discussed in relation to the environment.